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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/626,209	07/24/2003	Irving W. DeVoe	41056-101	9677
<div>26486      7590      07/02/2008</div> <div>BURNS &amp; LEVINSON, LLP</div> <div>125 SUMMER STREET</div> <div>BOSTON, MA 02110</div>				
EXAMINER				
MENON, KRISHNAN S				
ART UNIT		PAPER NUMBER		
1797				
MAIL DATE		DELIVERY MODE		
07/02/2008		PAPER		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

Application No.

10/626,209

Applicant(s)

DEVOE, IRVING W.

Examiner

Krishnan S. Menon

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 17 June 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 42, 47, 48, 50-52, 57-59, 68 and 71 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 42, 47, 48, 50-52, 57-59, 68 and 71 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Attachment Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-946)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

### DETAILED ACTION

Claims 42, 47, 48, 50-52, 57-59, 68 and 71 are pending as amended in the RCE of 5/14/08.

#### ***Claim Rejections - 35 USC § 112***

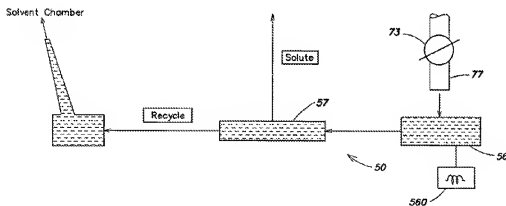
The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

1. Claims 57-59 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Claim 57 as amended 3/12/08 recite that the vacuum created in the solvent (first) chamber due to osmosis of solvent from the first chamber to the second chamber is utilized to lower the vapor pressure of a mixture of solvent and solute solution to aid in crystallization of the solute solution upon the application of an external energy source. Upon reading through the entire specification as originally filed, it is observed that page 18, line 3, - page 19, line 8, and figure 5 provides the closest disclosure to claim 57. Figure 6 combines figure 5 with the osmotic power conversion system. Lines 15-17 of page 8 discloses that *in the illustrated configuration* [by figure 5], *the blow down receiving chamber 56, the condenser 57 and the solvent chamber 20 are hermetically*

joined and the internal space throughout is under vacuum or near the vapor pressure of the solvent. However, figures 5 and 6 are grossly inadequate and does not provide any details of how the receiving chamber, the condenser and the first (solvent) chamber are linked together to keep them under vacuum generated by the first (solvent) chamber. There is no showing of how the vacuum generated in the first (solvent) chamber is utilized in maintaining a vacuum in the solvent condenser (57) and the blow-down chamber (56). The line from the solvent condenser to the osmosis unit (30) is labeled as transferring solute, and it goes to the solution chamber. The closed loop in figure 9 only provides a liquid line from the condenser to the solvent chambers 20 b and c. Since this vacuum generated in the solvent chamber by osmosis aiding the crystallization of the solute from the solute solution is an essential part of the claimed invention, the claims are not enabling. Figures 5,6 and 9 are reproduced below:



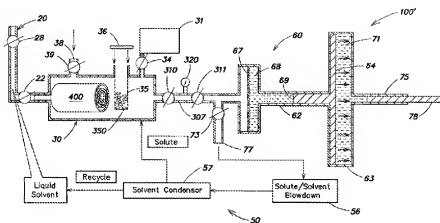


FIG. 6

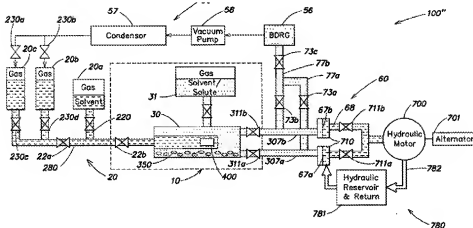


FIG. 9

Applicant's arguments presented in the RCE of 6/17/08 traversing this rejection are not persuasive.

Majority of the arguments (pages 7 and 8 of the arguments) are directed at how the Examiner should conduct the examining function. They do not render the claims any patentable merit.

The argument:

As pointed out above, the specification need not disclose what is well-known to those skilled in the art and preferably omits that which is well-known to those skilled and already available to the public. The connection of two or more chambers to one another using hermetically sealed connection to maintain a closed connection between the chambers is something that is well known. Gas connections that are sealed to avoid leakage of gas in or out only suggest that what is claimed is well known, in which case, the claims are not patentable. The blow-down chamber (56) is shown as connected to the high-pressure side (solute-solution chamber) in figure 6, so that it can accept the solute-solution. This would indicate that the blow-down chamber would be at a higher pressure than that of the first (solvent chamber). The Examiner submits that while making hermetically sealed connections between various chambers would be within the skill level of a person knowledgeable in this art, using the alleged vacuum generated by the solvent chamber to evaporate or assist in evaporating the solution in the blow-down chamber, if feasible, is not shown in an enabling manner in applicant's disclosure.

**The Examiner submits that the process claimed and the corresponding system disclosed are not logically feasible:**

- Solvent vapor has a tremendously large volume compared to that of the liquid. Taking water as an example, specific gravity of liquid water is 1.0, and that of water vapor is 0.0006 at atmospheric pressure and 100C temperature. At lower pressures, the specific gravity of vapor is even lower. This means that the volume required to sustain any vacuum with the volume flow of vapor generated by the solvent by evaporation is very high – more than a thousand times!

- The volume of space or void generated in the solvent chamber is only the volume of solvent liquid that permeated through the membrane. This volume is miniscule compared to the volume of the vapor of that liquid would occupy. For example, one liter of water moved across the membrane would generate 1 liter of void space in the solvent chamber. This one liter of water when evaporated would generate 1,670 liters of vapor at atmospheric pressure, and a lot more at any reasonable vacuum. ***So how is the one liter of vacuum generated by the movement of water across the membrane going to assist the evaporation of 1 liter of water?*** The only way to sustain vacuum in applicant's system is to have an external vacuum pump powered by an external power source. In addition, a huge volume evaporator and a huge volume condenser will be required to maintain a closed system to recycle the solvent compared to the volume of the liquid transported through the membrane. The vapor lines must accommodate more than a thousand times the volume flow of liquid solvent across the membrane. Thus enabling applicant's claims are not a simple matter as providing hermetically sealed pipelines. And any void volume created by the permeating solvent is grossly insufficient to maintain any vacuum in the system volume required to handle the vapor load, if such a void volume is created in the first place, which is improbable as shown below:

- The volume increased in the solution chamber is the volume of solvent migrated through the membrane. This volume increase in the solution chamber would generate a huge pressure increase in the solution chamber because the solution (or liquid) is comparatively incompressible. In applicant's figure 6, this would result in pushing the

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piston forward in the reciprocating engine. When the expansion is complete (or available sweep volume for the piston is exhausted), the system must reverse and divert the increased solution volume into the blow-down chamber.

- The solution that enters the blow-down chamber will have the same volume of solvent that permeated into the solution chamber through the membrane. (This is a closed system).

- This solution which is evaporated to get the solvent out of the solution, is condensed and then recycled back into the solvent chamber. Thus the volume of solvent that permeates through the membrane is put back into the solvent chamber by recycle. Thus the void volume generated by the solvent that permeated through the membrane is used up by the same volume of solvent that is recycled back into the solvent chamber. Thus the system is incapable of generating any vacuum!

2. Claims 42, 47, 48, 50-52, 68 and 71 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.
3. Claims 42, 47, 48, 50-52, 68 and 71 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for a closed system, does not reasonably provide enablement for extracting work when the second chamber is opened. The specification does not enable any person skilled in the art



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to which it pertains, or with which it is most nearly connected, to make and use the invention commensurate in scope with these claims.

The limitation:

~~periodically applying and opening the second chamber and removing a portion of the diluted solute solution from the second chamber and using the increased pressure of the removed portion~~ to drive a member which produces a movement from which work can be extracted; [claim 42], and

~~periodically opening the second chamber and applying and removing the a portion of the diluted solute solution and using the increased pressure of the diluted solute solution to drive a member which produces a substantial linear displacement of the object member;~~ [claim 50],

and the steps of opening the second chamber and closing the second chamber do not appear to be supported in the specification or claims as originally filed. The above quoted steps are also not enabled. Opening the chamber would result in loss of pressure. Therefore, the "removed portion" will have no pressure to extract work or drive a member.

For examination, the system is considered as "closed".

### ***Claim Rejections - 35 USC § 101***

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

1. Claims 57-59 are rejected under 35 U.S.C. 101 because the disclosed invention is inoperative and therefore lacks utility. Applicant's claimed process and the corresponding disclosure is incapable of the limitation:

*"forming the vacuum to aid in the crystallization of the solute".*

The objective reasoning to arrive at this conclusion is provided in the paragraphs supra.

***Claim Rejections - 35 USC § 102/103***

1. Claims 42, 47, 48, 50-52, 68 and 71 are rejected under 35 U.S.C. 102(b) as being anticipated by, or under 35 USC 103(a) as being obvious over, Loeb (US 3,906,250).

Loeb'250 teaches (see figures) a method of producing energy from a system having a semipermeable barrier separating a pressure chamber and a solvent chamber, wherein the pressure chamber has a solution (sea water) and solvent chamber has a solvent (river water), the solvent flows from the solvent chamber to the pressure chamber across the membrane, and the solvent chamber has a reduced pressure or even vacuum. See also figure 11, which is a closed system with the solvent chamber having only inflow, wherein the solvent chamber is at zero pressure. The solute solution is evaporated with external heat (like solar) in a third chamber – see figure 6 for example – and the solute is recycled as a concentrated solution.

With respect to the limitation,

utilizing the semi-permeable barrier to restrict solute from flowing into the first chamber while allowing the solvent to flow into the second chamber as the solvent flows from the first chamber into the second chamber a void is created in the first chamber such that a vacuum develops in the first chamber and increases the pressure in the diluted solute solution in the second chamber;

the creation of the void and the increase in pressure in the diluted solute solution in the

second chamber are inherent in the process of natural osmosis, and are not patentable process steps.

Opening the second chamber initially to add solute solution is implied in the reference in that the process in the reference would require opening and closing of valves to admit the various flows. If the steps of opening and closing the second chamber are intended to be physically opening and closing a lid of a container, then the claims are obvious – the reference has an automated system compared to applicant's manual process of opening a container for pouring and/or removing the contents and then closing it. Broadly providing an automatic or mechanical means to replace a manual activity which accomplished the same result is not sufficient to distinguish over the prior art. (In re Venner, 262 F.2d 91, 95, 120 USPQ 193, 194 (CCPA 1958). The inverse of this case law, replacing an automated process with a manual process, is also not patentable.

With respect to claim 50, a displacement of an object, such as a piston, is implied in the reference to a piston in column 11, lines 37-59.

The solvent chamber is pressurized by pumps.

2. Claims 42, 47, 48, 50-52, 68, and 71 are rejected under 35 U.S.C. 102(b) as anticipated by, or in the alternative, under 35 USC 103(a) as being obvious over DE 3121968.

DE teaches a method of pressurizing a solute solution and converting the pressure to energy (by a turbine or by a reciprocating machine, which is a piston machine: see claims 22, page 8, and 28, page 9 of the English translation of the

reference; piston in the reciprocating machine has linear displacement) using a solvent by passing the solvent across into the solution through a semipermeable membrane – see figures. The solution is exhausted after the pressure is converted to energy as claimed. Solvent chamber pressure reduces due to loss of solvent by osmosis, which would inherently create a loss of pressure, or vacuum, as discussed above. The solvent chamber (5) is pressurized by a pump – see figure 1, pump 22. In the figures, for example, figure 1, solvent chamber is (5), solution chamber is (6), and the membrane is (4).

DE teaches solvent recycle; and that the process of evaporation can be optimally selected from the various available methods – see pages 16-20 of the English translation (especially, page 18) – including air circulation, heat pump, and solar energy. Using vacuum for evaporation, particularly at ambient temperature, is known in the art. Even though the reference does not explicitly teach a third chamber, it is implied in terms of evaporation ponds or evaporators and condensers required in the various recycling schemes contemplated by the reference, which include both solvent and concentrated solute solution.

Opening the second chamber initially to add solute solution is implied in the reference in that the process in the reference would require opening and closing of valves to admit the various flows. If the steps of opening and closing the second chamber are intended to be physically opening and closing a lid of a container, then the claims are obvious – the reference has an automated system compared to applicant's manual process of opening a container for pouring and/or removing the contents and

then closing it. Broadly providing an automatic or mechanical means to replace a manual activity which accomplished the same result is not sufficient to distinguish over the prior art. (In re Venner, 262 F.2d 91, 95, 120 USPQ 193, 194 (CCPA 1958). The inverse of this case law, replacing an automated process with a manual process, is also not patentable.

3. Claims 57-59:

**Claims 57-59 could not be further treated on merits because there is no enabling disclosure or patentable utility to consider.**

***Response to Arguments***

Applicant's arguments filed 6/17/08 have been fully considered but they are not persuasive. They are mostly addressed in the rejection.

The argument:

To more clearly support the traverse of this rejection the following material is presented. In a fluid type system, such as Loeb or the German reference energy is added to a fluid system by adding additional fluid volume. Contrary to the cited prior art, Applicant's claimed invention differs from both Loeb and the German reference by increasing the pressure of the fluid contained in a constant volume container. Increasing the pressure of the available fluid is utilized by the claimed invention in order to provide the additional energy to the system.

does not make sense. If applicant's container is constant volume, how does it work with a moving piston? If additional energy is provided in applicant's system without any outside energy source such as by adding solvent or solute or both, then the system is not sustainable.

The argument that the teachings of the references are of continuous process whereas applicant's process is different is not commensurate in scope with the claims – there are no such limitations claimed.

Rest of the arguments are also not commensurate in scope with the claims and the rejection as well as ignore the explicit and implied teachings of the references. For example, the argument:

German reference. As with the Loeb reference, the claimed invention calls for the periodic opening of the initially closed and sealed second chamber to "periodically opening the second chamber and removing a portion of the diluted solute solution from the second chamber and using the increased pressure of the removed portion to drive a member which produces a movement from which work can be extracted." Again, this is neither disclosed, shown, taught nor suggested in the German reference.

shows that applicant ignores the teaching of the reciprocating system taught by the German reference, or the piston engines of the Loeb reference.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Krishnan S. Menon whose telephone number is 571-272-1143. The examiner can normally be reached on 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David R. Sample can be reached on 571-272-1376. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Krishnan S Menon/  
Primary Examiner, Art Unit 1797